Drifting hole in ozone creating alarm

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Body

SAN FRANCISCO - Puzzled atmospheric scientists have found, to their alarm, that the annual ozone hole over the South Pole drifted over Australia in December 1987, possibly endangering its inhabitants. The finding also raises the possibility that similar holes could exist over the Northern Hemisphere.

For three weeks, they discovered, the ozone shield over Australia was 10 percent thinner than it should have been, presumably allowing elevated levels of ultraviolet rays to penetrate to Earth. These rays can cause skin cancer.

Although scientists previously have found a slight thinning of the ozone layer over broad areas, the Australian ozone hole was apparently the worst sustained gap ever recorded over a populated region.

"We feel very much shaken by this," said Ralph Cicerone, an atmospheric chemist at the National Center for Atmospheric Research, in Boulder, Colo.

Cicerone, who spoke last week at a meeting of the American Geophysical Union, added that "we've got to double our efforts" to learn what the ultraviolet radiation that leaks through such holes does to plants and animals.

The discovery has given new weight to an upcoming scientific expedition to the Arctic to determine whether similar holes could form over the North Pole and drift above the Northern Hemisphere, Cicerone said. The expedition is being organized at NASA-Ames Research Center in Mountain View, Calif.

Ozone, a molecule formed naturally in the upper atmosphere, acts as a shield to limit the amount of solar ultraviolet radiation that reaches the Earth.

For two decades, scientists have suspected that human-made compounds, especially fluorocarbons used in refrigerators, air conditioners and formerly in spray cans, could drift up to the stratosphere and gobble ozone for many years.

Signs of such a depletion, a 6 percent decline in ozone over a 15-year period, have been found over the Northern Hemisphere.

But the big surprise came three years ago, when scientists discovered that for the past 10 years an ever-worsening hole had appeared each winter in the ozone over Antarctica. By October 1987, the start of the Southern Hemisphere's spring, half the ozone was missing.

Chemists blamed fluorocarbons for this ozone damage, too, after figuring out how the cold and wind patterns over the poles could help these chemicals destroy ozone. They didn't think, however, that this ozone hole could affect the rest of the hemisphere.

But now atmospheric chemists are mulling over the results of two separate experiments in December 1987, Cicerone said. Just as the annual Antarctic hole was dissipating on Dec. 10, instruments on the ground and aboard a U.S. satellite in orbit detected blobs of low-ozone air drifting toward Australia.

The ozone hole persisted until Dec. 30. This is the beginning of summer in Australia, Cicerone noted, when people would be most likely to be out in the sun.

The health effects aren't known, he said. "We just didn't anticipate changes like this."

Cicerone said he suspects that the same hole is not occurring again this year, because conditions are not as bad as last year. But since Antarctic ozone holes seem to be on an ever-worsening two-year cycle, he is not optimistic about next year.

Concern about similar conditions in the Northern Hemisphere have led to the airborne expedition to the Arctic now gearing up at the National Aeronautics and Space Administration's Ames Research Center.

Two research planes, loaded with scientific instruments, will leave Ames around New Year's Day for Stavanger, Norway. From that base, dozens of scientists will spend six weeks flying sorties over the Arctic, in search of the ice clouds that contribute to ozone depletion. They also will be looking for any signs that the areas of ozone loss drift southward across populated areas as spring approaches.

Brian Toon, an atmospheric scientist at Ames helping to organize the expedition, said the chances of finding a severe ozone loss are low but need to be checked out.

"The Arctic is a much more complicated place," Toon said. It doesn't get as cold as Antarctica in winter, and its air mass does not remain as isolated. Both those differences should reduce ozone losses.

Still, "we don't know everything about what's happening," he said, "and there could be a big ozone loss happening that's just hard to see."

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Graphic

CHART and DIAGRAM (Martha Thierry / Knight-Ridder Graphics Network: Antartic Hole in Earth's protective layer - effects of ultraviolet light and locatition of hole.

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